

## Problem Set 1

**Problem 1.1** Suppose  $\succsim$  is rational. Show that the following property holds:

If  $x \succ y \succsim z$  then  $x \succ z$ .

**Problem 1.2** Suppose  $\succsim$  is rational. Show that the following properties hold:

- (i)  $\succ$  is irreflexive and transitive;
- (ii)  $\sim$  is reflexive, transitive and symmetric.

**Problem 1.3** Consider the choice structure  $(\mathcal{B}, C(\cdot))$  with  $\mathcal{B} = \{\{x, y\}, \{x, y, z\}\}$  and  $C(\{x, y\}) = \{x\}$ . Show that if  $(\mathcal{B}, C(\cdot))$  satisfies the WARP then we must have one of the following choice rules:  $C(\{x, y, z\}) = \{x\}$  or  $C(\{x, y, z\}) = \{z\}$  or  $C(\{x, y, z\}) = \{x, z\}$ .

**Problem 1.4** Give an example of a choice structure that can be rationalized by several preference relations.

**Problem 1.5** Show that for a finite  $X$ , any rational  $\succsim$  generates a nonempty choice set  $C(B)$  for any nonempty  $B \subset X$ .